HANDHELD COMPUTER KEYBOARD SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. provisional patent application Ser. No. 60/104,172 filed Oct. 13, 1998, incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. The Field of the Invention

The present invention relates to keyboards for electronic devices and, more particularly, to keyboard accessories for handheld electronic devices such as personal digital assistants (PDAs).

2. The Relevant Art

Small personal organizers, personal digital assistants (PDAs), palm-size computers, combination phone/computers and other devices that are commonly termed "pen-based computers" often rely on the use of a stylus for data entry. The two most common methods for data entry utilizing a stylus are 1) tapping on an "on-screen software keyboard" and 2) hand writing on a pressure-sensitive layer. In the first method the electronic device displays a keyboard, buttons, or other indicia on a pressure sensitive screen, and the user selects the desired option by tapping an appropriate location with the stylus. In the second method the user moves the stylus across a pressure-sensitive surface to form characters. In this latter method, known as "handwriting recognition," the device must "recognize" the characters formed by the user on the pressure-sensitive surface. Handwriting recognition affords the user greater flexibility and speed in making notations and composing messages, but has been prone to errors in recognition.

Pen-based computers have grown in popularity for several reasons, chief amongst them being their small size and easy portability. Miniaturization of electronic components has made these devices increasingly powerful, versatile, and affordable. Many users, however, find the two available stylus data-entry methods cumbersome and prone to errors. The tapping method is typically slow, and the small screen area of PDAs increases the likelihood that a user will inadvertently make unintended selections.

The handwriting recognition method affords the user greater flexibility and ease of use over the tapping method for composing messages and entering data, but handwriting recognition has its own set of limitations. The character recognition programs at the heart of these handwriting recognition methods often need to learn the handwriting of the user in order to be effective. Many users do not have the time or patience to bring their pen-based computer through this learning process. Even those users that do train their pen-based computers to recognize their handwriting find that mistakes are unavoidable since the art of handwriting recognition is far from perfect. Errors will also be more common if the user attempts to use the device in a moving vehicle such as a car or train since the motion of the vehicle makes it more difficult to maintain one's handwriting style. Further, a pen-based computer trained to recognize one individual's writing style will not function well if transferred to a second user, and may never function well if several users routinely use it.

Most users of pen-based computers are already familiar with common keyboard designs as used on typewriters, standard computers, 10-key data entry devices, telephone keypads, and the like. Users are generally comfortable with using keyboards for composing text and entering data into electronic devices. It may therefore be desirable to attach a keyboard to PDAs and other pen-based computers in order to facilitate text and data entry.

To address some of these problems the Apple Newton PDA had an available accessory keyboard. The Newton PDA's keyboard, however, is attached to the Newton PDA by way of a somewhat cumbersome cable. Further, Newton PDA's keyboard was unprotected from damage during transport, unless it was inserted into a separate carrying case. Finally, the Newton PDA itself needed to be propped up or positioned for proper viewing when using the accessory keyboard.

SUMMARY OF THE INVENTION

This present invention is a handheld computer keyboard system for use in conjunction with small computerized apparatuses that typically do not have permanently attached keyboards. In one embodiment the system consists of a keyboard hinged to a cover and an interface assembly including an I/O connector configured to engage an I/O port of a computerized apparatus. In another embodiment the system also incorporates a stabilizing leg which may slide out from a recess in the back of the keyboard. The stabilizing leg is advantageous for providing support to the system in use such that the weight of the attached apparatus, use of a stylus, or incidental jostling does not tip the system over.

In another embodiment the hinge between the keyboard and the cover allows the cover to be opened to any one of several open positions so that the user may select the best angle for optimal viewing and use. The stabilizing leg in this embodiment slides rearwardly out from a recess in the back of the keyboard. This aspect is advantageous as it protects the stabilizing leg when not in use, and reduces the size of the keyboard.

The interface assembly is preferably attached to, and moves with, the cover portion so that the cover additionally serves to stabilize the attached computer apparatus regardless of the chosen open position. In one embodiment, the I/O connector is intended to engage the I/O connector of a personal digital assistant (PDA).

The keyboard is preferably arranged in the common QWERTY layout and a plurality of additional buttons are arranged above the numeral keys, although other keypad and keyboard layouts are also used. These additional buttons are designed to have programmable functionality such that the user may associate with each button one or more computer commands that will be executed when the button is depressed.

While these embodiments are aimed at providing a convenient portable keyboard for use with PDAs, other embodiments are envisioned that utilize less common keyboard designs, that are specific to other types of computerized apparatus of a similar form-factor, and that incorporate additional features such as additional I/O connectors, wireless modems, Global Positioning Satellite (GPS) receivers, and the like.

The present invention is advantageous to users of PDAs in that it provides them a better option for interacting with their PDAs. The use of a keyboard is more effective for most people than pen-based systems. The use of a keyboard instead of a stylus allows users to enter text and data more quickly and with a lower error rate. These advantages become more important when a PDA is used in a moving vehicle or by individuals with less steady hands, or by users who have not conditioned the PDA to recognize their own handwriting.